

Amendments to the Drawings

The attached replacement sheets of drawings includes changes to FIGS. 3, 4B, and 5A and replaces the original sheets 2/7 and 4/7.

In FIG. 3, the reference line for reference numeral "304" has been extended to reach a primary pi aperture, as described in para. [0020].

In FIG. 4B, the reference numeral "406" has been used to indicate resist, as described in para. [0021]. Also, inadvertent duplication of reference numeral "404" has been corrected by denoting the open apertures with numeral "408." This change has also been made in the specification.

In FIG. 5A, the inadvertent switching of reference numerals "504" and "506" has been corrected, an accordance with paragraph [0025] of the specification.

Attachments following last page of this Amendment:

Replacement Sheets (2 pages)

Annotated Sheets Showing Change(s) (2 pages)

the first 50 listed in Appendix A. With such widespread usage, the meaning of the term "primary feature" is clearly discernable.

Since there is no reason to believe that the meanings of "primary feature" and the other claim terms cited in the rejection would not be discernable, Applicant respectfully requests that the rejections be withdrawn.

Also, the rejection points out that the term "phase grating" is used elsewhere in the application but not in the claims. Applicant is at a loss to understand how this is relevant to whether or not the claims are indefinite and whether a statutory basis for this particular position in rejecting any claims in this application exists.

Accordingly, Applicant respectfully requests that the rejections be withdrawn.

CLAIM 1

Claim 1 was rejected under 35 U.S.C. § 102(e) as anticipated by U.S. Patent Publication No. 2004/0101765 to Sivakumar et al. (hereinafter "Sivakumar").

As amended, claim 1 relates to an apparatus that includes a plurality of features. The features include a plurality of primary features having different phase step heights in a primary feature region and a plurality of sub resolution features in a boundary region surrounding the primary feature

region. Each primary feature abuts at least one other primary feature with a different phase step height. Each of the primary features is dimensioned to resolve at an imaging plane at a resolution. Each of the sub resolution features is dimensioned not to resolve at the imaging plane at said resolution.

The rejection contends that Sivakumar's chromeless phase shift lithography mask includes such primary features. Applicant respectfully disagrees.

In this regard, attention is respectfully directed to Sivakumar's FIGS. 7A and 7B. As shown, masks 700, 702 each include a phase-shifting feature pattern 708, 710 that resolves to expose resist areas 712, 716. See also Sivakumar, para. [0031]. Since feature patterns 708, 710 themselves are resolved, the individual phase-shifting features within patterns 708, 710 do not resolve. Moreover, it is clear that patterns 708, 710 do not abut, nor do they have different phase step heights in any meaningful sense.

Accordingly, Sivakumar neither describes nor suggests primary features as recited in claim 1 and anticipation has not been established. Applicant respectfully requests that the rejections of claim 1 and the claims dependent therefrom be withdrawn.

CLAIM 10

Claim 10 was rejected under 35 U.S.C. § 102(e) as anticipated by Sivakumar.

As amended, claim 10 relates to a method that includes exposing a pattern of features in a layer of photoresist material on a mask substrate, developing the photoresist such that the mask substrate is uncovered in accordance with the pattern of features, etching the exposed mask substrate to define corresponding primary features and sub resolution features to have a phase step height in the mask substrate, and removing the remaining photoresist material. The pattern of features includes a plurality of exposed primary features in a primary feature region, a plurality of unexposed primary features in the primary feature region, a plurality of exposed sub resolution features in a boundary region surrounding the primary feature region, and a plurality of unexposed sub resolution features in a the boundary region. Each exposed primary feature abuts at least one other unexposed primary feature. No opaque material is found between the primary features and the sub resolution features on the mask substrate.

Sivakumar neither describes nor suggests exposing and developing such a pattern of features in a layer of photoresist material, much less etching the exposed mask substrate to define corresponding features.

In this regard, as discussed above, the individual phase-shifting features within Sivakumar's patterns 708, 710 do not resolve. No exposure and development of a pattern that includes abutting exposed and unexposed primary features occurs. Further, there are no primary features that have a meaningful phase step height in Sivakumar's mask substrate.

Accordingly, claim 10 is not anticipated by Sivakumar. Applicant respectfully requests that the rejections of claim 10 and the claims dependent therefrom be withdrawn.

CLAIM 16

Claim 16 was rejected under 35 U.S.C. § 102(e) as anticipated by Sivakumar.

As amended, claim 16 relates to an alternating phase shift mask (APSM). The mask includes a chromeless APSM structure including a plurality of features. The features include a plurality of zero and pi primary features in a primary feature region, wherein each zero primary feature abuts at least one pi primary feature, and a plurality of sub resolution features in a boundary region surrounding the primary feature region. Each of the primary features is dimensioned to resolve at an imaging plane at a resolution. Each of the sub resolution features is dimensioned not to resolve at the imaging plane at said resolution.

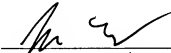
Sivakumar neither describes nor suggests such zero and pi primary features. In this regard, as discussed above, the individual phase-shifting features within Sivakumar's patterns 708, 710 do not resolve. Rather, Sivakumar's phase-shifting feature patterns 708, 710 resolve. It is clear that patterns 708, 710 do not abut, nor are they zero or pi primary features in any meaningful sense.

Accordingly, Sivakumar neither describes nor suggests primary features as recited in claim 16 and anticipation has not been established. Applicant respectfully requests that the rejections of claim 16 and the claims dependent therefrom be withdrawn.

Applicant asks that all claims be allowed. Enclosed is a check for excess claim fees. Please apply any other charges or credits to Deposit Account No. 06-1050.

Respectfully submitted,

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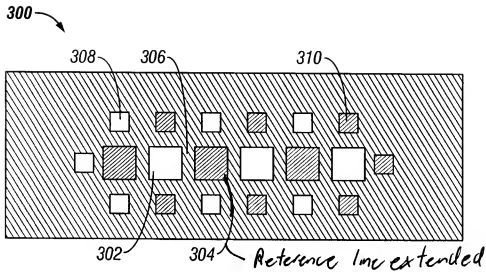


FIG. 3

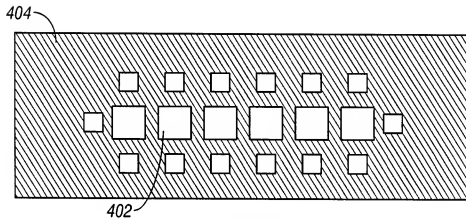


FIG. 4A

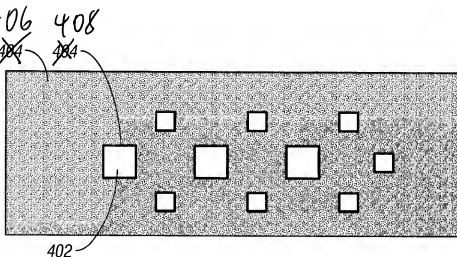


FIG. 4B

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